

Remarks & Arguments

In the Office Action, the Examiner noted that Claims 32-39, 41-65, 67-71, 73 and 74 are pending in the application, Claims 32-38, 41, 47-62, 68 and 74 have been withdrawn from consideration and that Claims 39-42-46, 63-65, 69-71 and 73 are rejected. By this amendment, Claims 39, 45, 46 and 67 have been amended and Claims 43 and 44 have been canceled without prejudice. Thus, Claims 32-39, 41-44, 47-65, 67-71, 73 and 74 are pending in the application. The amendments to the specification, claims, and drawings do not add new matter to the application. The Examiner's rejections are traversed below.

Objections to the Specification

The title of the invention is objected to as not being descriptive. The Applicants submit that the Examiner's proposed title is clearly not descriptive of the invention. Instead, the Applicants suggest that a more descriptive title would be "A Deep Well Capacitor Structure Having Separation Wells Between Segment of the Deep Well." If the Applicant's suggested new title is acceptable to the Examiner, the Examiner is authorized to amend the title by an Examiner Amendment.

The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. The Examiner alleges that the limitation of "wherein a doping

concentration of said separation well is greater than said p-type material substantially surrounding said deep n well” recited in Claim 39 does not have antecedent bases in the specification. The Applicants respectfully disagree with the Examiner’s position, and submit that the “p-type material substantially surrounding said deep n well” is described as lightly p doped (e.g., “epitaxial p- material) at page 5, line 24 through page 6, line 1 and Figure 1. The “separation well” is described as moderately doped (e.g., p) at page 8, lines 1-8. Accordingly, the specification provides proper antecedent basis for the claimed subject matter. The Applicants therefore request that the objection be withdrawn.

Objections to the Claims

Claims 42-45 are objected to for failing to further limit the subject matter of a previous claim. With regard to Claim 42, the Examiner alleges that the limitation “wherein said deep n well is parasitically coupled to said principal operating voltage” of Claim 42 has already been claimed in Claim 39. The Applicants respectfully submit that Claim 42 does further limit Claim 39 from which it depends. Claim 39 recites “a deep n well segmented into a plurality of substructures proximate each one of said plurality of transistors, wherein n-type material of said deep n well is coupled to said principal operating voltage.” Those skilled in the art appreciate that the deep n well may be coupled to the principal operating voltage any number of ways. Claim 42 further limits the any number of ways of coupling the deep n well to the principal operating voltage to only those ways that are parasitically coupled.

Claims 43 and 44 have been canceled rendering the objections thereto moot. In addition, the amendments to Claim 39 and 45 render the objection to Claim 45 moot. The Applicants therefore request that the objections be withdrawn.

Rejections Under 35 U.S.C. 112, First Paragraph

Claims 39, 42-46, 63-65, 69-71 and 73 stand rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description.

With regard to Claim 39, the Examiner alleges that the written description does not support the limitation “wherein a doping concentration of said separation well is greater than said p-type material substantially surrounding said deep n well.” The Applicants respectfully submit that the “p-type material substantially surrounding said deep n well” is described as lightly p doped (e.g., “epitaxial p- material) at page 5, line 24 through page 6, line 1 and Figure 1. The “separation well” is described as moderately doped (e.g., p) at page 8, lines 1-8. Accordingly, the specification provides proper support for the claimed subject matter. The Applicants therefore request that the rejection of Claims 39 and Claims 42-46, 63-65, 69-71 and 73 that depend from Claim 39 be withdrawn.

Claim 46 stands rejected under 35 U.S.C. 112, second paragraph, as failing to comply with the enablement requirement. The amendment to Claim 46 renders the rejection moot.

Claim 67 stands rejected under 35 U.S.C. 112, second paragraph, as being indefinite.

The amendment to Claim 67 renders the rejection moot.

Rejections Under 35 U.S.C. 102

Claims 69-71 stand rejected under 35 U.S.C. 102 as being anticipated by U.S. Patent No. 5,508,549 to Watanabe. It is well settled that in order to establish a prima facie case of anticipation the Examiner must show by a preponderance of the evidence that the relied upon reference teaches or discloses each of the claimed elements expressly or inherently as interpreted by one of ordinary skill in the art.

With regard to independent **Claim 69**, the Examiner refers to Watanabe at Figure 14, to support the assertion that Watanabe teaches “a deep well of a second conductivity type disposed between said one or more wells of said first conductivity type and a substrate of said first conductivity type, wherein said deep well includes a plurality of substructures having a plurality of gaps wherein said one or more wells of said first conductivity type are coupled to said substrate” and “a separation well of said first conductivity type disposed within one or more of said gaps and coupling said one or more wells of said first conductivity type to said substrate, wherein a doping concentration of said separation well is greater than said one or more wells of said first conductivity type and said substrate.” The Applicants respectfully disagree with the Examiner’s position, and suggest that the relied upon Figure 14 does not support the Examiner’s assertion. In particular, Figure 14 shows that the P+ buried regions 40, alleged to be a separation

well, are disposed entirely between the one or more P wells regions 5, alleged to be one or more wells, and the P substrate 1. Furthermore, Figure 14 shows that the N+ buried regions 2, alleged to be a deep well, are not disposed between the one or more P wells regions 5 and the P substrate 1, as interpreted by one of ordinary skill in the art. Instead, the N+ buried regions 2 are disposed entirely between the one or more N well regions 50 and the substrate 1.

For each of the reasons set forth above, Applicants respectfully submit that Claim 69 is patentable over Wanatabe. In addition, **Claims 70 and 71** are allowable by virtue of their dependency on respective base Claim 69, as well as the additional elements they recite. Accordingly, Applicants respectfully request that the anticipation rejection of Claims 69-71 be withdrawn and that Claims 69-71 be allowed.

Rejections Under 35 U.S.C. 103

Claims 39, 42-46, 63-65, 67 and 69-71 stand rejected under 35 U.S.C. 103 as being obvious in view of the combination of U.S. Patent No. 6,586,817 to Burr and U.S. Patent No. 5,508,549 to Watanabe.

Independent **Claim 39** recites “a separation well disposed between said plurality of substructures and between said p-type material beneath said deep n-well and above said deep n-well, wherein a doping concentration of said separation well is greater than said p-type material substantially surrounding said deep n well.” In contrast, Burr clearly discloses that the gaps (709, 709A, 709B) in the deep n-well 770 do not include separation wells. Furthermore, Burr

clearly discloses that the gaps (709, 709A, 709B) in the deep n-well 770 do not have “a doping concentration ... [that] is greater than said p-type material substantially surrounding said deep n well.” In fact the Examiner acknowledges that Burr does not disclose “a separation well disposed between said plurality of substructures and between said p-type material beneath said deep n-well and above said deep n-well, wherein a doping concentration of said separation well is greater than said p-type material substantially surrounding said deep n well.”

The Examiner, however, refers to Wanatabe at Figure 14, to support the assertion that Wanatabe teaches “an integrated circuit including separation well (40) disposed between the plurality of substructures (2) and having a doping concentration greater than that of the p-type material (1,5) surrounding the deep n well (2).” Again the Applicants respectfully disagree with the Examiner’s position, and suggest that the relied upon Figure 14 does not support the Examiner’s assertion. In particular, Figure 14 shows that the P+ buried regions 40, alleged to be a separation well, are disposed entirely between the one or more P wells regions 5 and the P substrate 1. Furthermore, Figure 14 shows that the N+ buried regions 2, alleged to be a deep well, are not disposed between the one or more P wells regions 5 and the P substrate 1, as interpreted by one of ordinary skill in the art. Instead, the N+ buried regions 2 are disposed entirely between the one or more N well regions 50 and the substrate 1.

Accordingly, neither Burr nor Wanatabe teach or suggest the combination of:

a deep n well segmented into a plurality of substructures proximate each one of said plurality of transistors, wherein n-type material of said deep n well is coupled to said principal operating voltage;

a p region substantially surrounding said deep n well, wherein p-type material of said p region is coupled to a ground reference; and

a separation well disposed between said plurality of substructures and between said p-type material beneath said deep n-well and above said deep n-well, wherein a doping concentration of said separation well is greater than said p-type material substantially surrounding said deep n well.

Applicants therefore respectfully submit that Claim 39 is patentable over Burr in view of Wanatabe. In addition, **Claims 42-46, 63-65 and 67** are allowable by virtue of their dependency on respective base Claim 39, as well as the additional elements they recite. Accordingly, Applicants respectfully request that the obviousness rejection of Claims 39, 42-46, 63-65 and 67 be withdrawn and that Claims 39, 42-46, 63-65 and 67 be allowed.

Independent **Claim 69** recites “a separation well of said first conductivity type disposed within one or more of said gaps and coupling said one or more wells of said first conductivity type to said substrate, wherein a doping concentration of said separation well is greater than said one or more wells of said first conductivity type and said substrate” as disclosed in Figure 1 and the written description at page 8, lines 2-11. In contrast, Burr clearly discloses that the gaps (709, 709A, 709B) in the deep n-well 770 do not include separation wells. Furthermore, Burr

clearly discloses that the gaps (709, 709A, 709B) in the deep n-well 770 does not have “a doping concentration ... [that] is greater than said one or more wells of said first conductivity type and said substrate.” In fact the Examiner acknowledges that Burr does not disclose “a separation well of said first conductivity type disposed within one or more of said gaps and coupling said one or more wells of said first conductivity type to said substrate, wherein a doping concentration of said separation well is greater than said one or more wells of said first conductivity type and said substrate.”

The Examiner, however, refers to Wanatabe at Figure 14, to support the assertion that Wanatabe teaches “an integrated circuit including separation well (40) disposed between the plurality of substructures (2) and having a doping concentration greater than that of the p-type material (1,5) surrounding the deep n well (2).” Again the Applicants respectfully disagree with the Examiner’s position, and suggest that the relied upon Figure 14 does not support the Examiner’s assertion. In particular, Figure 14 shows that the P+ buried regions 40, alleged to be a separation well, are disposed entirely between the one or more P wells regions 5 and the P substrate 1. Furthermore, Figure 14 shows that the N+ buried regions 2, alleged to be a deep well, are not disposed between the one or more P wells regions 5 and the P substrate 1, as interpreted by one of ordinary skill in the art. Instead, the N+ buried regions 2 are disposed entirely between the one or more N well regions 50 and the substrate 1.

Accordingly, neither Burr nor Wanatabe teach or suggest the combination of:

a deep well of a second conductivity type disposed between said one or more wells of said first conductivity type and a substrate of said first conductivity type, wherein said deep well includes a plurality of substructures having a plurality of gaps wherein said one or more wells of said first conductivity type are coupled to said substrate; and

a separation well of said first conductivity type disposed within one or more of said gaps and coupling said one or more wells of said first conductivity type to said substrate, wherein a doping concentration of said separation well is greater than said one or more wells of said first conductivity type and said substrate.

Applicants therefore respectfully submit that Claim 69 is patentable over Burr in view of Wanatabe. In addition, **Claims 70 and 71** are allowable by virtue of their dependency on respective base Claim 69, as well as the additional elements they recite. Accordingly, Applicants respectfully request that the obviousness rejection of Claims 69-71 be withdrawn and that Claims 69-71 be allowed.

Claim 73 stands rejected under 35 U.S.C. 103 as being obvious in view of the combination of U.S. Patent No. 6,586,817 to Burr, U.S. Patent No. 5,508,549 to Watanabe and U.S. Patent No. 6,900,091 to Williams. For each of the reasons set forth above, Applicants respectfully submit that independent Claim 69 is patentable over Burr in view of Watanabe.

Williams is cited as teaching “a second deep well of said second conductivity type disposed between said one or more additional wells of said first and second conductivity type and said substrate, wherein said one or more additional wells of said first conductivity type are isolated from said substrate by said second deep well.” Thus, Williams does not add anything to the teachings of Burr and Watanabe with reference to Claims 69. In particular, neither Burr, Watanabe nor Williams teach or suggest “a deep well of a second conductivity type disposed between said one or more wells of said first conductivity type and a substrate of said first conductivity type, wherein said deep well includes a plurality of substructures having a plurality of gaps wherein said one or more wells of said first conductivity type are coupled to said substrate” and “a separation well of said first conductivity type disposed within one or more of said gaps and coupling said one or more wells of said first conductivity type to said substrate, wherein a doping concentration of said separation well is greater than said one or more wells of said first conductivity type and said substrate.” Applicants therefore respectfully submit that Claim 73 is patentable over Burr and Watanabe in view of Williams based upon its dependency on Claim 69. Accordingly, Applicants request that the obviousness rejection of Claim 73 be withdrawn and that Claim 73 be allowed.

Conclusion


For all the reasons advanced above, Applicants respectfully submit that the present application is in condition for allowance and that action is earnestly solicited. The Examiner is

invited to contact Applicants' undersigned representative if the Examiner believes such action would expedite resolution of the present Application.

The Commissioner is hereby authorized to charge any additional fees, which may be required for this amendment, or credit any overpayment, to Deposit Account 504160. In the event that an extension of time is required, or may be required in addition to that requested in a petition for an extension of time, the Commissioner is requested to grant a petition for that extension of time which is required to make this response timely and is hereby authorized to charge any fee for such an extension of time or credit any overpayment for an extension of time to Deposit Account 504160.

Respectfully submitted,
MURABITO, HAO & BARNES LLP

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Eric J. Gash
Registration No. 46,274
Tel.: (408) 938-9080 ext. 127